

SIUDA, I.P., kand. tekhn. nauk, dotsent (Novocherkassk)

Loss and efficiency diagrams of a.c. power transmission lines.  
Elektrichestvo no.1:71-72 Ja '64. (MIRA 17:6)

SIUDA, I.P. (Novocherkassk)

Calculation of transit tuned electric power transmission lines.  
Izv. AN SSSR.Energ. i transp. no.1:94-99 Ja-F '65. (MIRA 18:4)

BIUDA, Krzysztof

Ecological and ethological observations on *Eristalis tenax* L. (Diptera, Fam. Syrphidae) and *Tegenaria domestica* Clerck (Arachnidae, Fam. Agelenidae) hibernating in the caves and subterranean casemates in the vicinity of Krakow. *Prace zool. no. 8-83-112* (1963 publ. '64).

1. Department of Animal Psychology and Ethology of the Jagiellonian University, Krakow. Head: prof. R. Mojzusiak.

SIUDA, Stanislaw

Morphology of the adrenal cortex of *Sorex araneus* Linnahus,  
1758 during the life cycle. Acta theriolog 8 no.1/16:115-  
124 '64.

1. Department of Histology and Embryology of the School of  
Medicine, Bialystok.

SIUDA, Wojciech, Dr. (Poznan)

Legal character of stevedoring agreements and award contracts  
of arbitration decisions. Tech gosp morska 13 no.10:296-297  
0 '63.

SIUDA, Wojciech, dr.

Liability of port tally and supervision enterprises.  
Tech gosp morska 14 no.2:40-42 F '64.

SIUDA, Wojciech, dr.

Responsibility of the shipyard for ship repairs. Tech gosp  
morska 14 no.10:295-297 0 '64.

1. School of Economics, Poznan.

RATAJCZYK, Florian; SIUDA, Zdzislaw

Sintering of bifocal eyeglasses. Szklo 13 no.3:76-80 Mr  
'62.



L 64916-65

ACCESSION NR: AP5019626

PO/0034/65/000/007/0309/0313  
621.317:621.315.592

AUTHOR: Siuda, Zbigniew (Master engineer)

16  
B

TITLE: Electrical design of rectifier-type meters using Polish semiconductor diodes

SOURCE: Pomiar, automatyka, kontrola, nc. 7, 1965, 309-313

TOPIC TAGS: semiconductor diode, volt meter design, millivolt meter design, micro-ampere meter design, rectifier circuit

ABSTRACT: The paper discusses rectifier circuits, shown in Fig. 1 of the Enclosure, for use in rectifier-type meters and employing germanium diodes. The advantages of using such diodes for this application are enumerated. Such diodes are going into production in the Zaklad "Tewa" ("Tewa" Plant). The circuits and the factors determining the temperature error of rectifier-type meters are discussed, and a formula for the temperature error due to the variation of the diode forward resistance with temperature is derived. A simple method of compensating the temperature error due to the variation of diode characteristics with temperature is shown. The temperature error due to the variation of the diode feedback resistance with temperature is also considered. The paper presents some results of measuring the following parameters of some Polish germanium point-contact diodes: static voltage-current characteristic, dynamic forward-current re-

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ACCESSION NR: AP5019626

sistance vs current, variation of the dynamic forward-current resistance for a temperature change of 10°, variation of voltage-current characteristic with temperature from -20°C to +40°C. On the basis of the experimental and theoretical results circuits were developed for rectifier-type meters for current ranges from 150  $\mu$ A to 600 mA and voltage ranges from 1.5 v to 600 v. Schematics of the meters are shown. The meters were fabricated and 36 meters were tested for temperature error; the measurement results are shown in a table. Their temperature error was small enough and all meters have passed the Polish standard requirements. For volt meters the maximum frequency error did not exceed 1.5% and for millivolt meters and microampere meters it did not exceed 2.0%. Orig. art. has: 9 figures, 5 tables and 18 formulas.

ASSOCIATION: None

SUBMITTED: 00

NO REF SOV: 000

ENCL: 01

SUB CODE: EC

OTHER: 002

Card 2/3

L 64916-65

ACCESSION NR: AP5019626

ENCLOSURE: 01

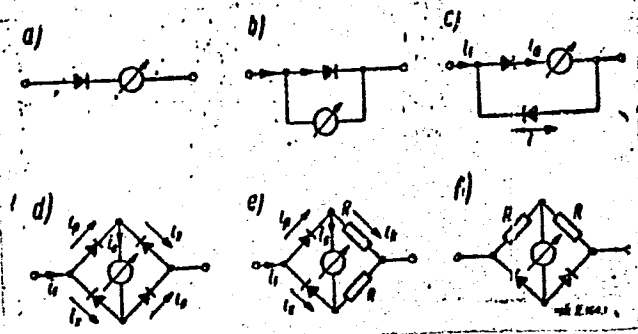


Figure 1. Diagrams of rectifier circuits.

Card 3/3 *mlb*

DUDKOWSKI, Leszek; SIUDAK, Adam

Three cases of lung paragonimiasis. Gruzlica 25 no.1:  
57-62 Jan 57.

1. Z Dziecięcego Ośrodka Prewentoryjno-Sanatoryjnego w  
Rabce Dyrektor; dr. M. Milewski. Adres: Rabka-Zdroj.

(PARAGONIMUS, infect.

lunga (Pol))

(LUNG DISEASES, case reports

paragonimus infect. (Pol))

SIUDAK, F.

Journal of the Science of  
Food and Agriculture  
April 1954  
Agriculture and Horticulture.

(3)

Reeds and reed grasses as silage plants. J. Dubiski, T. Przeczek,  
and F. Siudak (*Roczn. nauk Roln.*, 1963, 64, 2, No. 1, 87-107).—  
Reed grasses (*Carex*) in June and the common reed (*Phragmites  
communis*) in mid-May contain > the min. sugar content needed  
for normal lactic fermentation (final pH 4.2) during ensilage. Both  
yielded silage of good quality (aroma, colour, structure, freedom  
from butyric acid). Initial addition of cultures of lactic organisms  
slightly improved the silage from reed grasses but had no beneficial  
effect on that from the reed. Reed grasses were not eaten by  
livestock, either green or as hay, but were readily consumed as  
silage. A. G. POLLARD.

RUSSIA, S.

"Vistula River", P. 7, (TERRA, No. 5, August 1954, Warsaw, Poland)

cc: Monthly List of East European Accessions (EMA), LG, Vol. 4, No. 3,  
March 1955, Encl.

SIEDONSKA, Krystyna

Research on impurity sedimentations in solutions of balsam pine resin. Prace nauk roln i lesn 17 no.3:481-514 '65.

1. Department of Chemical Wood Technology of the School of Agriculture, Poznan. Head: [prof. dr] Stanislaw Prosinaki.

9.5320  
15.2120

89145  
P/015/60/000/012/002/002  
A076/A026

AUTHORS: Nowak, Lutosław; Siudyka, Stanisław

TITLE: Infrared Radiation Absorbing Glass

PERIODICAL: Szkło i Ceramika, 1960, No. 12, pp. 361 - 364

TEXT: As a result of the increasing demand (about 100,000 m<sup>2</sup> annually) for automobile windshields made of glass which absorbs infrared radiation, the Centralne Laboratorium Przemysłu Szklarskiego (Central Laboratory of the Glass Industry) began laboratory and industrial tests connected with production technology of 6-mm thick glass absorbing about 70% of infrared radiation in the range of from 0.7 to 3.0 μ. The research was divided into a) laboratory tests, b) melting on small industrial scale in the Huta Szkła "Jasło" (Glass Plant "Jasło") and c) melting on industrial scale in the ZSL "Wałbrzych". Laboratory investigations were made on glass melted in a laboratory furnace, and its absorption properties were tested with a Zeiss spectrophotometer in the range of from 0.7 to 3.0 μ. A normal d-c "Nitra" lamp was used as infrared radiation source and the monochromator was equipped with saline prism making possible the measurement of infrared radiation up to 17 μ. The test results revealed that the glass produced by the ZSL "Wałbrzych" plant has

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TUSZYNSKI, Wacław; SIUDYKA, Stanisław

Quality control of Fourcault glass. Szkło 13 no.1:10-17 Ja '62.

POLAND

ZWOLINSKI, Jerzy and SIUDZINSKI, Stanislaw; Chair of Special Animal Breeding (Katedra Szczegolowej Hodowli Zwierzat,) Head (Kierownik) Prof Dr Stefan ALEXANDROWICZ; and Department of Horse Breeding (Zaklad Hodowli Koni,) Head docent Dr Jerzy ZWOLINSKI, Agricultural University (WSR,) Poznan.

"Time of Day at Which Foaling Occurs."

Lublin, Medycyna Weterynaryjna, Vol 21, No 10, Oct 65; pp 614-616.

Abstract [English summary modified]: Study to verify the truth of the old popular belief that mares always give birth to their foals during the most inconvenient time of the night - analysis of 1007 cases during a period of 9 months seems to confirm it: over 75% were born at night. This is attributed to neuropsychological influences, ability of pregnant mare to postpone onset of parturition until the stable is relatively quiet. Four Polish 1 German ref.

1/1

L 17711-66 EWT(1) IJP(8) AT  
ACC NR: AP6006833

SOURCE CODE: UR/0181/66/008/002/0475/0477

AUTHOR: Kovalevskaya, G. G.; Nasledov, D. N.; Siukayev, N. V.; Slobodchikov, S. V.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-tekhniche-  
skiy institut, AN SSSR); North Ossetian State Pedagogical Institute im. K. L.  
Khetagurova, Ordzhonikidze (Severo-Osetinskiy Gosudarstvennyy pedagogicheskiy institut)

TITLE: Spectral photosensitivity in n-type InP

39

SOURCE: Fizika tverdogo tela, v. 8, no. 2, 1966, 475-477

TOPIC TAGS: photosensitivity, photoconductivity, impurity center

ABSTRACT: Results are given of an investigation of the spectral distribution of photoconductivity of InP n-type specimens with carrier concentrations from  $10^{16}$  to  $10^{18} \text{ cm}^{-3}$  at 80 and 296K. Deeply located photoactive impurity centers with energies of 0.33 and 0.14 eV and an impurity level with an energy of 0.04 eV were found in the forbidden zone. The spectral distribution of natural photoconductivity measured at 80K showed the width of the forbidden zone determined from  $\lambda_{1/2}$  to be  $E_G = 1.41 \text{ eV}$ . The peak of photosensitivity corresponded to  $\lambda = 0.90-0.91 \mu$ . The natural photore-sponse had a smaller value than the impurity photosensitivity. No correlation was found between the electron concentration and the location of the peak within the interval  $n = 10^{16}-10^{18} \text{ cm}^{-3}$ . Measurements performed at 296K showed that  $\lambda_{1/2}$  for the peak of impurity photoconductivity corresponds to 1.21 eV. The width of the forbidden

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ACC NR: AP6006833

zone at room temperature was  $E_G = 1.35$  ev. The presence of minority carrier traps and the strong effect of the capture of nonequilibrium current carriers with the aid of traps on the lifetime of electrons and holes were evident. The lifetime evaluated by means of photoconductivity was of the order of  $10^{-6}$  sec and the rate of surface recombination was  $10^4 - 2 \times 10^3$  cm $\cdot$ sec $^{-1}$  and depends on the surface treatment. Orig. art. has: 3 figures. [JA]

SUB CODE: 20/ SUBM DATE: 17Aug65/ ORIG REF: 001/ OTH REF: 006/ ATD PRESS:

4209

Card 2/2 net

S/126/61/012/005/021/028  
E040/E435

AUTHORS: Starodubov, K.F., Babich, V.K., Siukhin, A.F.,  
Gasik, L.I.

TITLE: Changes in plasticity of cold-drawn wire during its  
annealing in the temperature range of 300 to 600°C

PERIODICAL: Fizika metallov i metallovedeniye, v.12, no.5, 1961,  
765-768

TEXT: Changes in plasticity properties of St 50 steel were investigated at the Dnepropetrovskiy Metallurgical Institute by determining the relative elongation and reduction in cross-section area of vacuum-annealed specimens held for 1, 5, 10, 15 and 30 min at temperatures in the range of 300 to 600°C. After annealing, the specimens were examined by X-rays (interference lines from (110) and (220) planes). Tests were also made on cold-worked specimens at 61.6 and 87.5% deformation. Relative elongation was found to increase with increasing temperature of annealing with a maximum of 6 to 7% corresponding to annealing temperatures within the range of 300 to 350°C. A further increase of the annealing temperature (up to 550°C) and specimen holding for  
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S/126/61/012/005/021/028  
EO40/E435

Changes in plasticity of cold-

periods of 1 to 60 min has no effect on the relative elongation whose value remains constant for a given degree of cold-working. When the specimen deformation was increased from 61.6 to 87.5% the relative elongations dropped by an approximately constant value in comparison with those given by non-deformed specimens. Identical values of the relative elongation of specimens subjected to the two degrees of deformation were obtained after annealing at 600°C. On the other hand, values of the reduction in specimen cross-section area drop sharply with increasing degree of deformation. The curve of reduction in area vs annealing temperature passes through a minimum corresponding to 450 to 550°C, depending on the duration of specimen holding at a given temperature. This is explained as being due to diffusion processes, which reduce the permissible distortion of the crystal lattice and result in a reduction of strength. A significant weakening of the background intensity in X-ray diagrams is regarded as confirming the above conclusions. It is postulated that the observed reduction in the plasticity of steel during annealing is the consequence of a breakdown of the grain and block

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boundaries caused, in its turn, by their penetration by dislocations and also by a non-uniform distribution of the dislocations in the sub-grains volume (polygonization). The increase in plasticity of the steel observed at temperatures exceeding 500°C is ascribed to the onset of recrystallization. G.V.Kurdyumov and L.I.Lysak are mentioned in connection with their contributions in this field. There are 5 figures and 3 Soviet-bloc references.

ASSOCIATION: Dnepropetrovskiy metallurgicheskiy institut  
(Dnepropetrovsk Metallurgical Institute)

SUBMITTED: January 29, 1961

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25228  
S/148/62/000/001/013/015  
E073/E535

AUTHORS: Starodubov, K.F., Gul', Yu.P. and Sinkhin, A.F.  
TITLE: Application of induction heating for producing high strength tubes with a clean surface

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, no.1, 1962, 169-170

TEXT: The authors carried out experiments for the purpose of producing tubes, with high mechanical properties and a surface free from peeling-off scale, by means of induction heating (67 kc/s), applying a special cooling regime. The tubes, made of the steel 10GN (10sp) were 40 mm in diameter, 360 mm long, the wall thickness was 1.5 mm and the heating speed was 600°C/sec. The heat treatment consisted of heating to 1000°C, quenching with water, by means of a special tangential sprayer with slot openings, down to 700-600°C and then in air. This heat treatment ensured decomposition of the austenite in the range of pearlitic transformation. As a result of these experiments, tubes with a clean surface and high mechanical and technological properties were obtained. The microstructure of the weld and of the near-weld zone did not

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VISHNYAKOV, Dmitriy Yakovlevich, prof., doktor tekhn. nauk;  
ROSTOVTSEV Gennadiy Nikolayevich; NEUSTRUYEV, Aleksandr  
Aleksandrovich; STARODUBOV, K.F., doktor tekhn. nauk,  
prof. akademik, retsenzent; SOKOLOV, K.N., doktor tekhn.  
nauk, prof., retsenzent; DOLZHENKOV, I.Ye., kand. tekhn.  
nauk, dots., retsenzent; SHTEPENKO, V.Z., kand. tekhn.nauk,  
dots. retsenzent; KRAVTSOV, A.F., kand. tekhn. nauk, dots.,  
retsenzent; FIL'TSER, G.A., dots., retsenzent; SILICH, A.N.,  
st. prepodav., retsenzent; SIUKHIN, A.F., assistant,  
retsenzent; SAVEL'YEV, L.P., assistant, retsenzent

[Equipment, mechanization and automation of heat-treating  
plants] Oborudovanie, mekhanizatsiia i avtomatizatsiia v  
termicheskikh tsekhakh. Moskva, Metallurgiya, 1964. 467 p.  
(MIRA 17:10)

1. Akademiya nauk Ukr. SSR (for Starodubov).

STARODUBOV, K.F., akademik; BABICH, V.K.; SIUKHIN, A.F. [Siukhin; O.F.]

Nature of processes occurring during the quenching of hardened low-carbon steel. Dop. AN URSR no. 12:1590-1593 '64. (MIRA 18:1)

1. Dnepropetrovskiy metallurgicheskii institut. 2. AN UkrSSR (for Starodubov).

STARODUBOV, P.F.; DAVID, S.R.; SIUKHIN, A.F.

Effect of the tempering temperature on the properties of hardened  
low-carbon steel. Izv.vys.ucheb.zav.; Chern.met. 8 no.6:137-139  
'65. (MIRA 18:8)

1. Dnepropetrovskiy metallurgicheskiy institut.

22267

S/109/61/006/005/014/027  
D201/D303

9.2572

AUTHORS: Siulina, G.A., Feshchenko, G.A. (Deceased)

TITLE: Spin levels of  $Fe^{3+}$  ion in corundum

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 5, 1961,  
806 - 814

TEXT: Good understanding of the electron paramagnetic resonance of the  $Fe^{3+}$  ion in corundum is of great importance in designing paramagnetic amplifiers since, because of small distances between the spin doublet, a small or even no magnetic field, permits the realization of paramagnetic amplifier in the centimetric frequency range as stated in L.S. Korniyenko and A.M. Prokhorov (Ref. 1: ZhETT, 1959, 36, 919, and J.E. King, and N.W. Terhune (Ref. 2: J. Appl. Phys. 1959, 30, 1844). For an arbitrary orientation of axes of the magnetic field and of the trigonal axis, the  $Fe^{3+}$  ions form two magnetic non-equivalent systems according to L.S. Korniyenko and A.M. Prokhorov (Ref. 3: ZhETT, 1957, 33, 805) and G.S. Bogle and

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H.F. Symmons (Ref. 4: Proc. Phys. Soc. 1959, 73, 531) each producing its own system of lines of various intensities. The richness of this spectrum permits a good study of cross-relaxation phenomena in a paramagnetic amplifier. The original work of analysis of the paramagnetic resonance of the  $\text{Fe}^{3+}$  ion in  $\text{Al}_2\text{O}_3$  was carried out by L.S. Korniyenko and A.M. Prokhorov (Ref. 3: Op.cit.), who showed that the observed spectrum of the electron paramagnetic resonance can be explained by the spin-Hamiltonian as proposed by B. Bleaney and R.S. Trenam (Ref. 6: Proc. Roy. Soc., A., 1954, 223, 1); they also measured its constants at room temperatures. The evaluation of Eigen-values and of wave functions for parallel orientation was done by V.M. Vinokurov, M.M. Zaripov and N.R. Yafayev (Ref. 7: ZhE TT, 1959, 37, 312). In the present article the authors evaluate the numerical values of the levels of energy for an arbitrary orientation of the magnetic field with respect to the trigonal axis in the planes, for which all ions are magnetically equivalent. Numerical results are compiled as tables and graphs which permit determina-

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D201/D303

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tion of the value of the magnetic field, the orientation of the crystal and the wave length of the subsidiary radiation. This permits design of a paramagnetic amplifier for a given frequency band and evaluation of the probabilities of transition for the main and the subsidiary radiation. The splitting of spin levels of the  $\text{Fe}^{3+}$  ion in corundum is described by the spin-Hamiltonian of the form

$$\begin{aligned} \hat{H} = g\beta \vec{H} \cdot \vec{S} + \frac{a}{6} [\hat{S}_x^4 + \hat{S}_y^4 + \hat{S}_z^4 - \frac{1}{5} S(S+1)(3S^2+3S-1)] + \\ + D [\hat{S}_z^2 - \frac{1}{3} S(S+1)] + \frac{1}{180} F [35\hat{S}_z^4 - 30S(S+1)\hat{S}_z^2 + \\ + 25\hat{S}_z^2 - 6S(S+1) + 3S^2(S+1)^2]. \end{aligned} \quad (1)$$

where  $S$  - the effective spin ( $S = \frac{5}{2}$ );  $\hat{S}_x, \hat{S}_y, \hat{S}_z$  - operators of the spin projection on the axes of the co-ordinate systems, for which  $z$ -axis coincides with the trigonal axis of symmetry of the crystal field;  $\hat{S}_x, \hat{S}_y, \hat{S}_z$  - operators of the spin projections in the cubic

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system;  $\vec{H}$  - vector of the external magnetic field;  $g$  - coefficient of spectroscopic displacement;  $\beta$  - Bohr magneton;  $D, F$  - constants of the electric crystal fields of the trigonal symmetry of the 2nd and 4th order respectively;  $a$  - constant of the electric field of cubic symmetry. The matrices of the spin-Hamiltonian (1) have been evaluated in the case when the diagonal operators are  $S^2, S_z$ . Using

the three dimensional rotation matrix with  $\theta = 125^\circ 16'$ ,  $\varphi = 225^\circ$ ,  $\psi = 0$ , it can be shown that in  $S_z$  representation the energy matrix has the form of

$$\begin{pmatrix} \frac{10-b}{3} + \frac{\sqrt{5}}{2}h \sin \alpha & 0 & -ic & 0 & 0 \\ + \frac{5}{2}h \cos \alpha & & & & \\ \frac{\sqrt{5}}{2}h \sin \alpha \left[ -\frac{2}{3} + b + \right] & \sqrt{2}h \sin \alpha & 0 & 0 & 0 \\ + \frac{3}{2}h \cos \alpha & & & & \end{pmatrix} \quad (3)$$

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$$\mathcal{H}_{ik} = \begin{pmatrix} 0 & \sqrt{2} h \sin \alpha \left[ -\frac{8+2b}{3} + \frac{3}{2} h \sin \alpha \right] & 0 & ic \\ ic & 0 & \frac{3}{2} h \sin \alpha \left[ -\frac{8+2b}{3} - \frac{h}{2} \cos \alpha \right] & \sqrt{2} h \sin \alpha \\ 0 & 0 & 0 & \sqrt{2} h \sin \alpha \left[ -\frac{2}{3} + b - \frac{3}{2} h \cos \alpha \right] \\ 0 & 0 & -ic & 0 \end{pmatrix} \begin{pmatrix} \frac{\sqrt{5}}{2} h \sin \alpha \\ \frac{\sqrt{5}}{2} h \sin \alpha \left[ \frac{10-b}{3} - \frac{5}{2} h \cos \alpha \right] \end{pmatrix} \quad (3)$$

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where  $h = \frac{g\beta}{D} H$ ,  $b = \frac{a - F}{D}$ ,  $c = \frac{2}{3} \sqrt{5} \frac{a}{D}$  are dimensionless quantities. The Eigen-values are the roots of the secular equation

$$|\mathcal{H}_{ik} - \epsilon \delta_{ik}| = 0, \quad (4)$$

where  $\epsilon = \frac{E}{D}$ . It can be shown that these roots are real numbers. The authors have numerically evaluated in Eq. (4) in the interval  $\alpha = 0 - 90^\circ$ ,  $h = 0 - 5.9$  in steps  $\Delta h = 0.1$ ,  $\Delta \alpha = 5^\circ$ . The behavior of energy levels with the changing magnetic field is graphically represented for  $\alpha = 0^\circ, 30^\circ, 60^\circ$  and  $90^\circ$  respectively. The appendix gives the values of energy of spin levels  $\epsilon_i$  of the  $Fe^{3+}$  ion in corundum for eight orientations of the external magnetic field relative to the trigonal axis of the crystal ( $\alpha = 0, 15, 30, 45, 60, 75, 90^\circ$ ) in steps  $\Delta h = 0.2$  ( $\Delta H = 364.5$  oersted). It has to be pointed out that in calculations, the value

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$\frac{63}{64} \frac{a - F}{D} + \frac{35}{12} = 3.1104$  has to be added to matrices (3). The authors

express their gratitude to A.M. Prokhorov and L.S. Korniyenko for their interest and help. There are 5 figures, an appendix with tabulated numerical results, and 7 references: 3 Soviet-bloc and 4 non-Soviet-bloc. The references to the English-language publications read as follows: J.E. King, R.W. Terhune, J. App. 1 Phys., 1959, 30, 1844; G.S. Bogle, H.F. Symmons, Proc. Phys. Soc., 1959, 73, 531; N. Bloembergen, S. Shapiro, P.S. Persham, J.O. Artman, Phys. Rev., 1959, 114, 445; B. Bleaney, R.S. Trenam, Proc. Roy. Soc., A., 1954, 223, 1. X

SUBMITTED: March 29, 1960

Card 7/7

SIULLI, I.; SIULLI, S.; FISCHER, J.

On the extrapolation of the experimental scattering amplitude  
to the spectral function region. Dubna, Ob"edinennyi in-t  
iadernykh issl. 1961. 7 p.

(No subject heading)

SIULLI, I.; SIULLI, S.; FISCHER, J.

On the extrapolation of the experimental scattering amplitude  
to the spectral function region. Dubna, Ob"edinennyi in-  
tadernykh issl. 1961. 7 p.

(No subject heading)

I. 20414-66 ENT(d)/EWP(1) IJP(e) BB/GG

ACC NR: AP6009909

SOURCE CODE: UR/0413/66/000/004/0106/0106

INVENTOR: Gorshkov, A. F.; Kirpichnikov, V. M.; Siunov, M. N.

42  
B

ORG: none

TITLE: Buffer memory circuit. Class 42, No. 179095

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 4, 1966, 106

TOPIC TAGS: computer component, buffer memory, storage device, magnetic core storage, computer memory

ABSTRACT: The Author Certificate introduces a ferrite-core buffer memory utilizing

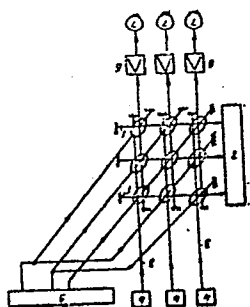


Fig. 1. Buffer memory circuit

1 - Horizontal recording buses;  
2 - generators for selection of horizontal buses; 3 - vertical write buses; 4 - generators for selection of vertical buses;  
5 - generators for diagonal read buses; 6 - amplifiers; 7 - recording units.

UDC: 681.142.523.8.07

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ACC NR: AP6009909

square matrices. Matrix configuration is shown in Fig. 1. Orig. art. has:  
1 figure. 0

[DW]

SUB CODE: 09/ SUBM DATE: 22Jun64/ ATD PRESS: 4222

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BK

L 38446-66 EWT(1)

ACC NR: AP6019229

(N) SOURCE CODE: UR/0144/66/000/002/0150/0154

AUTHOR: Siunov, M. N.

ORG: None

TITLE: Geometry of closed slots in short-circuited rotor of induction motor

SOURCE: IVUZ. Elektromekhanika, no. 2, 1966, 150-154

TOPIC TAGS: electric motor, electric power equipment /A101-8 induction motor

ABSTRACT: The author presents a selection of formulas and curves needed for determining the dimensions of closed slots in the rotor of induction motor. The formulas and curves are selected from four Soviet and German sources mentioned as references at the end of the article. The optimal dimensions are chosen from a series of various versions calculated by using experimental curves and empirical data. The method of calculation is based on calculating the magnetic permeance of closed slot for various steels and slot sizes. An example of calculation is presented for a 75 kw, 380 v, 740 rpm induction motor of A101-8 type.

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UDC: 621.313.33 + 621.3.044

L 38446-66

ACC NR: AP6019229

The versions for semi-closed and closed slots are presented and the results of calculations are compared. Then, the optimal size is selected as shown in a cross-section of the slot. The proposed method of calculation can be applied to the design of induction motors in accordance with the GOST specifications. Orig. art. has: 5 figures, 3 formulas.

SUB CODE: 09/ SUBM DATE: 12June65/ ORIG REF: 003/ OTH REF: 001

Card 2/2



L 00809-67 EWT(d)/EWP(1) IJP(c) BB/GG  
ACC NR: AP6015577 (N) SOURCE CODE: UR/0146/66/009/002/0074/0078

AUTHOR: Kirpichnikov, V. M.; Gorshkov, A. F.; Siunov, M. N.

ORG: Ural Polytechnic Institute im. S. M. Kirov (Ural'skiy politekhnicheskii institut)

TITLE: Model of high-speed recorder unit using flash lamps

SOURCE: IVUZ. Priborostroyeniye, v. 9, no. 2, 1966, 74-78

TOPIC TAGS: computer, digital computer, computer component

ABSTRACT: An experimental recorder unit<sup>66</sup> intended for receiving alphanumerical information from digital computer is described; the information can be recorded on a photo film or a xerox paper. A step register logically converts information and makes up the lines on the film which enhances the speed of operation. A principal circuit of the recorder unit is briefly explained. IFK-120 flash lamps operating with a very low duty factor help in transmitting characters to the photo film; writing density, 2000 lines per m. The writing rate of the new experimental unit is claimed to exceed that of the regular "Ural-2" computer by 11 times; it can be varied within 1--13200 lines per min. Orig. art. has: 2 figures and 5 formulas.

SUB CODE: 09 / SUBM DATE: 23Feb65 / ORIG REF: 004

Card 1/1 vlr

UDC: 681.142.5

SIUNOV, N. S.

PA47T41

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USSR/Engineering  
Welding, Electric  
Transformers

Jan 1948

"Analysis of Characteristics of Welding Transformers,"  
Prof N. S. Siunov, Dr Tech Sci, Ural Industrial Inst,  
2½ pp

"Vest. Elektro-Prod" No 1

Presents simple graphic method to study characteristics of welding transformers. System based on the principle of comparative units, with formulas and graphs.

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47T41

SIUNOV, N. S., PROF

PA 19/49T39

USSR/Engineering  
Welding, Arc  
Welding - Equipment

Oct 48

"Selection of Equipment for Welding by Three-Phase  
Arc," Prof N. S. Siunov, Dr Tech Sci, Ural Polytech  
Inst, 5 pp

"Avtozhennoye Delo" No 10 - pp.1-6

Three-phase arc welding is more economical than  
single-phase. Discusses use of single-phase weld-  
ing transformers, special three-phase regulated  
welding transformers and three-phase welding trans-  
formers with separate regulators. Includes 15  
diagrams.

~~TOP~~

19/49T39

1

B

Regulation of Welding Current by Three-Phase Saturable Choke Coils. (In Russian.) N. S. Sinyav. *Avto gennor Delo* (Welding), Mar. 1949, p. 1-6.

Describes and diagrams the above, which may also be used for other purposes. Operating characteristics are tabulated.

✓

ASPH-35.4 METALLURGICAL LITERATURE CLASSIFICATION

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

38/49T21

USSR/Electricity  
Motors, Electric  
Rotors

Mar 49

"The Problem of Efficient Designing of Large Low-Speed Electric Motors," Prof N. S. Siunov, Dr Tech Sci, Ural Polytech Inst, 2 pp

"Elektrichestvo" No 3

Recommends more critical approach in construction of electric motors. Refers to two types of motor rotors changes in rotor for type DA-170, motor now in use at the "Uralslektroapparat" Factory, made possible a decrease 15 - 20 % in weight of rotor. By reducing  
38/49T21

USSR/Electricity (Contd)

Mar 49

weight of rotor and stator of motor, decrease in cost and weight is possible. Gives two illustrations of rotors, and cost table of stator of motor DA-213.

SIUNOV, N. S., PROF

38/49T21

SIUNOV, N. S., Prof

PA 167T68

USSR/Metals - Welding

Aug 50

"Equipment for Welding With Three-Phase Arc,"  
Prof N. S. Siunov, Dr Tech Sci, Ural Polytech  
Inst

"Avtogen Delo" No 8, pp 12-15

Since 1949, Sverdlovsk Electromech Plant has  
manufactured apparatus for manual welding with  
3-phase arc. Equipment of 3-ST type consists  
of 3-phase transformer, welding current regula-  
tor, magnetic contactor, and special electrode  
holder. Describes equipment and characteris-  
tics of 3-phase welding installation. Method

167T68

USSR/Metals - Welding (Contd)

Aug 50

simplifies welder's operations, sharply in-  
creases productivity, and reduces electric power  
consumption 20-25%.

167T68

BYUNOV, N. G., Prof.

Electric Engineering - Periodicals

Removing individual shortcomings, Elektrichestvo No. 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress, May 1953. Unclassified.

1. SYUNOV, N.S.; ARRAMASTSEV, D.A.
2. USSR (600)
4. Electric Welding
7. Contactless regulators for welding with a three-phase arc, Prof. N.S. Syunov, D.A. Arramastsev, Avtog.delo 24 no. 3, 1953.
9. Monthly List of Russian Accessions, Library of Congress, APRIL 1953, Uncl.



SIUNOV, N.S., professor, doktor tekhnicheskikh nauk; URMANOV, R.N.,  
kandidat tekhnicheskikh nauk.

Basic relationships in a three-phase welding arc. Elektrichestvo  
no.2:18-21 F'55. (MLRA 8:2)

1. Ural'skiy politekhnicheskiy institut im. Kirova.  
(Electric welding)

SIUNOV, N. S.

USSR/ Engineering - Welding apparatus

Card 1/1 Pub. 11 - 3/8

Authors : Siunov, N. S., Arzamastsev, D. A.

Title : Principles of designing of control apparatus for manual welding with a three-phase arc

Periodical : Avtom. svar. 8/1, 25-38, Jan-Feb 1955

Abstract : The design, assembly and operation of the ZRST control apparatus for manual welding of metal with a three-phase arc, are described. Formulas are given for calculating phase control units and impedance coils. Eight USSR references (1948-1953). Illustrations; diagrams; drawings.

Institution : The Ural S. M. Kirov Polytechnical Institute

Submitted : July 25, 1954

SIUNOV, N.S.; URMANOV, R.N.

Three-phase arc welding with nonmelting electrodes. Avtom.  
svar. 8 no.6:49-53 N-D '55. (MLRA 9:6)

1.Ural'skiy politekhnicheskiy institut imeni S.M.Kirova.  
(Electric welding)

SIUBOV, N.S., doktor tekhnicheskikh nauk, professor; SERGEYEV, M.A.,  
kandidat tekhnicheskikh nauk.

Selection of principal parameters of machines for condenser  
butt welding. Svar.proizv. no.12:4-6 D '55. (MIRA 9:2)

1.Ural'skiy politekhnicheskii institut imeni S.M.Kireva.  
(Electric welding)

AID P - 4516

Subject : USSR/Engineering-Welding  
Card 1/1 Pub. 107-a - 2/13  
Authors : Siunov, N. S. and V. P. Sivtsov  
Title : Monophase Welding Transformer Combined with D-C Saturable Reactor.  
Periodical : Svar. proizv., 2, 4-6, F 1956  
Abstract : A description of combination of a single-phase welding transformer with a d-c controllable reactor designed by the Ural Polytechnic Institute is presented by the authors with results of the test given in detail. Five graphs, 2 photos and 2 drawings.  
Institution : Ural Polytechnical Institute  
Submitted : No date

SIUMOV, N.S., doktor tekhnicheskikh nauk; SERGEYEV, M.A., kandidat  
tekhnicheskikh nauk.

Heat processes in condenser discharge butt welding. Trudy  
Ural. politekh. inst. no.62:4-11 '56. (MLRA 10:2)

(Electric welding)

SIUNOV, N.S., doktor tekhnicheskikh nauk, professor; KUBRAKOV, L.N.,  
kandidat tekhnicheskikh nauk.

A "double" electrical transmission for mechanical power. Elektrichestvo  
no.2:71-74 F '57. (MLRA 10:3)

1. Ural'skiy politekhnicheskii institut im. Kirova.  
(Electric power distribution)

AUTHOR: Siunov, N.S. Professor, Doctor of Technical Science 3-5-17/38

TITLE: To Educate on Concrete Matters (Vospityvat' na konkretnykh delakh)

PERIODICAL: Vestnik vysshey shkoly, 1957, Nr 5, pp 49-53 (USSR)

ABSTRACT: The author reports on the educational work of the Ural Polytechnical Institute imeni Kirov. Certain teachers of social science did not immediately understand their mission and sometimes were evasive in answering questions. Due to this, the institute was subjected to a severe criticism from the party. This year a reorganization of the educational work took place. At present, for instance, many special chairs proceed with large-scale projects during the courses. Generally practical experience helps the students. The author states that systematic excursions to industrial works are an important educational factor. New methods of instruction resulted from the possibility of teaching directly at the plants. The Komsomol organizations also tell the students to co-operate with industrial workers. The Komsomol members of the Faculty of Metallurgy concluded an agreement of co-operation with the Komsomol members of the metallurgical works of Verkh-Isetsk. More than 200 students, in particular of the

Card 1/2



SIUNOV, N.; SIVTSOV, V.

"Combined one-phase welding transformer with choking coil for saturation. Tr.  
from the Russian."

p.17 (Ratsionalizatsiia, Vol. 7, no. 3, Mar. 1957, Sofia, Bulgaria)

Monthly Index of East European Accessions (EEAI) LC, Vol. 7, No. 8, August 1958

SIUNOV, N.S.; URMANOV, R.N.

Analysis of schematic diagrams of three-phase arc welding with  
single-phase adjustable chokes. Avtom.svar. 10 no.4:1-14 J1-Ag '57.  
(MIRA 10:10)

1. Ural'skiy politekhnicheskiy institut imeni S.M.Kirova.  
(Electric welding)

Excitation of a Synchronous Motor of Normal Construction SOV/105-56-8-9/21  
With the Application of Mechanical Rectifiers

winding in the stator. The circuit diagram is described. Subsequently the operation of the transformer in a circuit with the three-winding adjustable transformer is investigated. It is shown, that a sufficient resistance of the brush contact, a small equivalent inductivity of the transformer equipment and an accurately determined position of the brush holder must be guaranteed in order to ensure a satisfactory performance of the mechanical rectifier. In connection with the experimental investigation of the synchronous motor with a mechanical rectifier its performance was examined at a continuous and at a sudden change of load. The numerous results showed a satisfactory commutation of current in the whole range of motor load. The motor operates stably and with a practically spark-free commutation at a sudden change of load from zero to 70% of nominal load. As a summary it is stated: The excitation of synchronous motors of normal design of small and medium power can be performed by means of a mechanical rectifier. The rectifier is connected to the output side of a three-phase transformer with three windings and a controllable magnetic shunt. 2) The circuit described guarantees an auto-

Card 2/3

Excitation of a Synchronous Motor of Normal Construction  
With the Application of Mechanical Rectifiers

SOV/105-58-8-9/21

matic increase of exciter current with an increase of load in the motor. 3) The commutation of the mechanical rectifier is satisfactory at a slow as well as at a sudden change of load. There are 7 figures and 3 references, all of which are Soviet.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. Kirova (Ural Polytechnical Institute imeni Kirov)

SUBMITTED: March 4, 1958

1. Electric motors--Design
2. Motor generators--Application
3. Electric circuits--Test results
4. Transformers--Performance

Card 3/3

Sov/133/58-9-10/29

AUTHORS: Siunov, N. S. (Dr. Tech. Sciences, Professor), Rezin, M. G. (Candidate Tech. Science), Kholodov, A. I. (Candidate Tech. Sciences, Docent), , Osykhovskiy, I. G. (Candidate Tech. Sciences Senior Lecturer)

TITLE: The Choice of Some Parameters of the Electro-Magnetic Stirrer for an Arc Furnace (Vybor nekotorykh parametrov dugovogo statora elektromagnitnogo peremeshivatelya zhidkoy stali)

PERIODICAL: Stal', 1958, Nr 9, pp 802-806 (USSR)

ABSTRACT: After a brief outline of the principle of operation of an electro-magnetic stirrer and advantages in its use (based on Western literature) the authors consider the problem of choice of some of its main parameters for a given velocity of movement of metal on the bottom of a furnace. The following parameters are considered: number of poles of the stator arc, length of Statov's arc, air gap arc, frequency of the current, length of the core. Theoretical considerations were tested on a model using mercury at room temperature (Fig.5). Good agreement between the calculated and actual velocities of the movement of the metal was obtained. Two designs of electro-magnetic stirrers developed by the

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Sov/133/58-9-10/29

The Choice of Some Parameters of the Electro-Magnetic Stirrer for  
an Arc Furnace

electrotechnical and electrometallurgical department of  
the Urals Polytechnical Institute in cooperation with the  
works UAZ, UZTM and VIZ will be soon introduced into the  
industry. There are 5 figures.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Urals Polytech-  
nical Institute)

Card 2/2

AUTHORS: Siunov, N.S., and Sergeyev, M.A. SOV-125-58-10-6/12

TITLE: The Origin of the Arc in Butt Condenser Welding (O voznik-  
novenii dugi pri stykovoy kondensatornoy svarke)

PERIODICAL: Avtomaticheskaya svarka, 1958, Nr 10, pp 55 - 59 (USSR)

ABSTRACT: The origin of the arc in butt condenser welding is analyzed. On the basis of existing data it is concluded that the major factor of the arc origin is the melting of microprotrusions on the ends of the parts to be welded, and vapor formation of the metal. If there are such vapors in the interelec-  
trode gap, the development of the discharge can be explained on the basis of the thermo-electronic theory of the arc. Stability of the arc depends mainly on the transitional contact resistance. A formula is recommended to calculate the melting coefficient which determines the quantity of the arc heat consumed by burning-out and evaporation of

Card 1/2

The Origin of the Arc in Butt Condenser Welding

SOV-125-58-10-6/12

the metal. An equation is given to determine the speed of the movement of the welding device's movable head which ensures the stability of the arc. There are 4 oscillograms, 1 circuit diagram and 5 Soviet references.

ASSOCIATION: Ural'skiy politekhnicheskii institut im. S.M. Kirova  
(Ural Polytechnical Institute imeni S.M. Kirov)

SUBMITTED: May 28, 1958

- |                           |                              |
|---------------------------|------------------------------|
| 1. Electric arcs--Theory  | 2. Electric arcs---Stability |
| 3. Arc welding--Equipment | 4. Mathematics               |

Card 2/2



SOV/3-58-11-2/38

AUTHOR: Siunov, N.S., Doctor of Technical Sciences, Professor, Institute Director

TITLE: Use the Extensive Possibilities of a Multi-department Vuz (Ispol'zovat' bol'shiye vozmozhnosti mnogofakul'tetnogo vuza)

PERIODICAL: Vestnik vysshey shkoly, 1958, Nr 11, pp 7 - 9 (USSR)

ABSTRACT: During the post-war years, the number of higher educational institutions in the eastern districts of the USSR has rapidly increased. There are in Sverdlovsk alone 11 higher schools (including the Ural Polytechnical Institute with 20,000 students). Professor M.G. Chilikin [Ref 2] was right in asserting that the demands raised by industry in respect to higher school graduates have considerably changed. Soviet industry now requires a specialist of versatile education with a thorough theoretical and good practical training. The vuzes, however, while supplying the students with sufficient theoretical knowledge, do not ensure the required practical training, thus compelling the young engineer to complete his education at places of production. The admittance of students with a record of practical experience radically changes the situation. In 1957, the Ural Polytechnical Institute had 70 % secondary school graduates in

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SOV/3-58-11-2/38

Use the Extensive Possibilities of a Multi-department Vuz

the 1st course against 36 % in 1958. The most rational type of school for training engineers, according to V.P. Yelutin, Minister of Higher Education, is a large multi-faculty vuz where favorable conditions are created for an outstanding scientific personnel capable of conducting important scientific work and of ensuring a high standard of training. The Ural Polytechnical Institute with 10 day-time faculties and over 9,500 students, 3 evening faculties with 1,700 students and 3 correspondence faculties with over 8,700 persons, is one of the most flexible types of educational institutes, ensuring a connection between theoretical education and practical experience. This combined type of a polytechnical vuz is considered by many other vuzes as the most rational one, where students of the junior courses study by correspondence, combining work with study, while at the senior courses

Card 2/3

SOV/3-58-11-2/38

Use the Extensive Possibilities of a Multi-department Vuz

they join the day-time faculties. The total time of study at the institute must not exceed 6 years. There are 2 Soviet references.

ASSOCIATION: Ural'skiy politekhnicheskiy institut imeni S.M. Kirova (Urals Polytechnical Institute imeni S.M. Kirov)

Card 3/3

ANTIPOV, M.F., aspirant; SIUNOV, N.S., doktor tekhn. nauk prof.

Calculating the parameters of a combined stator for asynchronous  
motors. Trudy Ural. politekh. inst. no.90:35-43 '58.

(MIRA 13:2)

(Electric motors, Induction)

SYUNOV, N.S., doktor tekhn. nauk prof.; TARASOV, N.M., aspirant

Investigation of synchronous motors of low and medium power  
with excitation from the semiconductor rectifiers. Trudy Ural.  
politekh. inst. no.90:78-90 '58. (MIRA 13:2)  
(Electric motors, Synchronous)

8(5)

AUTHORS:

1959-2-10/25  
Sinnov, N. S., Professor, Doctor of Technical Sciences,  
Tarasov, N. M., Engineer

TITLE:

Synchronous Motor With Semi-Conductor Rectifier Excitation  
(Sinkhronnyy dvigatel' s vzbuzhdeniyem ot poluprovodnikovykh  
vypriamiteley)

PERIODICAL:

Elektrichestvo, 1959, Nr 2, pp 40-43 (USSR)

ABSTRACT:

The choice of the circuit for the excitation of synchronous compound motors is of decisive importance for their working characteristics. For simplification of the excitation circuit of synchronous motors by semiconductor rectifiers it is suitable to employ special transformer installations. These ensure the motor operation with a leading current at all ratings. In this case the authors used a three-phase 3 winding transformer for feeding the exciter circuits of synchronous motors. The transformer was regulated by an adjustable magnetic shunt or at increased power by means of a reactor in the current circuit of the primary winding. It is shown that the parameters of the proposed connection must be determined commencing with no-load operation and the nominal motor rating. The given explanations were tested by experiments. The inves-

Card 1/3

SOV/105-59-2-10/25

Synchronous Motor With Semi-Conductor Rectifier Excitation

tigation of the synchronous compound motors with an excitation scheme given here showed a series of positive peculiarities:

- 1) These motors have practically a constant  $\cos \varphi$  within a wide range of load variation. The excitation scheme permits the motor to be easily accommodated to the operational conditions, e.g. to increase the wattless output at little loads.
- 2) The motors dispose of a remarkable static and dynamic overload capacity.
- 3) The motors with rated load on the shaft keep synchronous operation even at a considerable decrease of the line voltage. Therefore it is not necessary to force compound motors with reference to voltage. At a line-voltage reduction the motors take up more wattless power.
- 4) At full-load starting the motors come up to their rated speed.
- 5) When designing motors the air gap can be kept considerably smaller than in the case of motors with separate exciters where the air gap is determined by the motor stability. The dimensions of the air gap must in the case of compound motors be determined by the admissible losses and the mechanical reliability as the stability is granted by the excitation system.
- 6) The motors can operate at impulse and pulsating load. There are 7 figures, 1 table and 3 Soviet references.

Card 2/3

AUTHORS: <sup>Nikolay SERGEYEVICH</sup> Siunov, N.S., Doctor of Technical Sciences, Professor,  
and Kovylov, B.V., Aspirant SOV/144-59-6-5/15

TITLE: The Influence of Additional Capacitance on Current Commutation

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Elektromekhanika, 1959, Nr 6, pp 34 - 40 (USSR)

ABSTRACT: A very brief review is given of recent work on the physical processes of the final stage of current commutation in machines. The process is explained with reference to the diagram in Figure 1. The short-circuit time  $T$  in the diagram generally differs from the actual time of the electro-magnetic transient commutation process, so that there is a residual current  $i_0$  at the instant when contact is broken. Previous authors have noted the influence of the coil capacitance on the commutation current, its effect being to reduce the probability of sparking. Since the natural capacitance of a coil is very small, Tur, in an article in Elektrichestvo, 1956, Nr 11, described the effects of including an additional capacitance ten times as great as the natural capacitance.

Card1/6



SOV/144-59-6-5/15

The Influence of Additional Capacitance on Current Commutation

In order to study the influence of such additional capacitance, the authors built a rig, the schematic circuit diagram of which is given in Figure 2. The parallel circuits of the machine are represented by two generators and the portion undergoing commutation by an inductance and resistance in series shunted by a capacitance. A commutator is provided and as it rotates the section investigated is periodically shorted. The inductance and resistance were given values typical of an ordinary machine but the added capacitance was  $10^{-14}$   $\mu\text{F}$ . This is much greater than typical normal values of  $2 \times 10^{-4}$   $\mu\text{F}$  but was necessary in order to reveal the influence of capacitance on commutation. The equipment was used to plot curves of sparking threshold and of permissible sparking zones both with and without capacitance. The curves shown in Figure 3 represent the threshold of sparking taken with the natural capacitance of  $2 \times 10^{-4}$   $\mu\text{F}$  and with an additional capacitance of  $10$   $\mu\text{F}$ . It will be seen that the addition of capacitance displaces

Card2/6

SOV/144-59-6-5/15  
The Influence of Additional Capacitance on Current Commutation

the curve of sparking threshold in such a way that the commutating properties are improved and, in addition, the zone of permissible sparking is extended. Equations (1) and (2) are the main differential equations of the final stage of commutation; they are solved in an appendix, where it is shown that when  $C = L/r^2$  the commutation process is aperiodic. If the ohmic resistance of the section is constant the capacitance at which the aperiodic process commences depends on the section inductance, as indicated in Table 1. It is shown that the values of current in the capacitance, current in the section, voltage in the section and rate of voltage-restoration are primarily functions of the current in the capacitance at the instant when the brush breaks circuit, which is taken as the initial time.

If the process is periodic the current and voltage in the section each consist of two components: one is constant and the other is periodic and diminishes exponentially.

Card3/6

SOV/144-59-6-5/15

The Influence of Additional Capacitance on Current Commutation

By increasing the capacitance the frequency of the periodic component is decreased.

In actual machines the natural capacitance of the commutator and section is always much smaller than the values given in Table 1, whilst the values of inductance and resistance are similar; thus, a damped periodic process is always present in actual machines.

An oscillogram of the section voltage taken on the experimental rig with the natural capacitance of  $10^{-4}$   $\mu$ F is given in Figure 4. It will be seen that in this case the variable component of the voltage becomes a peak. An oscillogram of the current in the section in the presence of additional capacitance is given in Figure 5 and if the current curve is compared with one constructed from Eq (13) of the appendix it will be seen that the agreement is good. Correspondingly, the oscillogram of Figure 6 and Eq (14) of the appendix relate to section voltage and are in good agreement.

Card4/6 Certain differences between conditions in actual machine commutators and in the rig are briefly explained with

SOV/144-59-6-5/15

The Influence of Additional Capacitance on Current Commutation

reference to the sketch in Figure 7. It is shown that there is a certain voltage  $U_1$  at which the contacts can break without arcing, even though there is a considerable current before the circuit is interrupted. Commutation can be improved by reducing the voltage; in general, this is only possible by reducing the constant component by the use of interpoles or by reducing the amplitude of the varying component by increasing the capacitance. In the limiting case, when the capacitance is sufficient to make the process aperiodic, the amplitude of the section over-voltage is equal to the constant component and if this is made equal to the voltage  $U_1$  no sparking will occur, whatever the value of current interrupted. There are 7 figures, 1 table and 5 Soviet references.

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SOV/144-59-6-5/15

The Influence of Additional Capacitance on Current Commutation

ASSOCIATION: Kafedra elektricheskikh mashin, Ural'skiy politekhnikheskiy institut (Dept. of Electrical Machines, Ural Polytechnical Institute)

SUBMITTED: April 29, 1959

Card 6/6

SOV/110-59-7-9/19

**AUTHOR:** Siunov, N.S., Professor, Doctor of Technical Sciences

**TITLE:** A Plant and a VUZ (Zavod i vtuz)

**PERIODICAL:** Vestnik elektropromyshlennosti, 1959, Nr 7, pp 39-41 (USSR)

**ABSTRACT:** The Uralelektroapparat works operates in close collaboration with the Ural Polytechnical Institute imeni S.M. Kirov. Many students of the Institute are at the works, and many of the works' staff lecture at the Institute. The Institute is doing research for the works, especially on the reduction in size of oil circuit-breakers. Docents I.I. Ponomarev, R.L. Malkina, and A.A. Oatul have developed a method of designing circular and ellipsoidal cylindrical tanks and have shown that the rating of oil circuit-breakers can be increased without using thicker tank walls by making use of the plastic properties of the materials. I.V. Tarlinskiy and A.N. Kosukhin have also done theoretical and experimental work on this problem. It has been demonstrated that breaker ratings can be increased without increasing size. At present, R.L. Malkina, V.V. Kolobov, L.L. Chmerinskiy and A.N. Kosukhin are working on the calculation of dynamic loading of circuit-breaker tanks and their

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SOV/110-59-7-9/19

A Plant, and a VVEZ

Akodie

Card 2/3

foundations which is a neglected problem of practical interest. Engineers from the works, including V.A. Yiditskiy, G.A. Chetchuyev, T.Ya. Buben, B.I. Reder, are also participating in practical and theoretical research work. There is already a need for circuit-breakers with a rupturing capacity of 25 million kVA at 500 kV. Because the requisite short-circuit testing facilities are very expensive, ~~Dector of Technical Sciences M.M.~~ is investigating artificial testing circuits. The works is at present completing the construction of a short-circuit testing station using these methods, which will give ratings of 5 to 10 million kVA. By further development it is expected to obtain equivalent ratings of 30 to 40 million kVA from a short-circuit testing laboratory with a normal rating of 5 million kVA. Assistance has also been given to the works in the design of arc-suppression devices for oil circuit-breakers. A recurrent-surge cathode ray oscillograph with electro-magnetic shutter has been devised for the study of transient processes in rectifiers and high-voltage circuit-breakers. A good deal of work has been done

SOV/110-59-7-9/19

A Plant and a ~~VNUZ~~

on the cooling of electrical machines under the guidance of Cand.Tech.Sci. D.S. Zhevakhov, and has resulted in the re-design of heat exchangers for rectifiers. Doctor of Technical Sciences, P.S. Mamykin, who works on the technology of silicates, has helped the works in the manufacture of ceramics. The works has collaborated in drafting the research plan of the Institute. The laboratories of the Uralelektroapparat works are soon to be extended and then further fruitful collaboration with the Ural Polytechnical Institute is to be expected.  
There are no figures, no tables.

Card 3/3



SOV/144-59-9-3/15

and

AUTHORS: Siunov, N.S., Professor, Dr. Tech. Sci.,  
Yushmanov, Yu.I., Aspirant

TITLE: The Influence of the Method of Connecting the Stator and  
Rotor Windings on the Operation of a Doubly-fed Motor

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy,  
Elektromekhanika, 1959, Nr 9, pp 15-19 (USSR)

ABSTRACT: Despite their advantages, doubly-fed motors are not yet widely used, mainly because they will not run up to speed independently. They have also a tendency to hunt, but this can easily be overcome. Schematic circuit diagrams of such motors, both with series or parallel connection of stator and rotor windings, are given in Fig 1 and circle diagrams are constructed in order to study their behaviour. To this end, expression (6) is derived and curves of mutual reactance as functions of magnetising current are given in Fig 2. With the windings connected in series the properties of the circle diagram depend upon whether the transformation ratio from primary to secondary is unity or not. If it is unity the applied voltage is divided equally between stator and rotor and the magnetic flux remains practically constant over the working range, ✓

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though the saturation diminishes somewhat near maximum loads because of the voltage drop in the windings. The iron becomes saturated near the no-load point at which the circle diagram of current is distorted and passes from circle 1 to circle 2 of Fig 3. If the transformation ratio is not unity the magnetic flux is not constant because the magnetising current is not constant, and when the motor is running at full speed and load the stator voltage is greater than the supply voltage. Experimental curves of the increase in voltage on the windings as the load is increased with a transformation ratio of 0.345 are given in Fig 4. A circle diagram for the case when the transformation ratio is 0.345 is given in Fig 5. As the magnetising current rises and the mutual reactance drops, the current curve passes from circle 1 to circle 3. The maximum torque and the overload capacity are much lower than when the transformation ratio is unity. The case of parallel-connected windings is then considered. Eq (9) is derived and it is found that when the transformation ratio is unity the current diagram is the same as for the series case. ✓

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When the transformation ratio is not unity the voltages applied to stator and rotor must be such that the volts per turn on both is the same, otherwise energy passes between stator and rotor by a transformer effect, which increases the losses and impairs the power factor. A circle diagram for the case when there is a different number of turns on the stator and rotor is given in Fig 6. Here the transformation ratio is 0.345, and although the performance is not so good as when the transformation ratio is unity, its deterioration is not so great as in the case of series connection. For purposes of comparison, data for doubly-fed motors with series and parallel connection and various transformation ratios are given in Table 1. The data apply to a motor type AK-52-4 which, under induction-motor conditions, has a rated output of 4.5 kW and a power factor of 0.83. In an induction motor, power is supplied only to the stator and the rotor carries only the power loss, whilst in the doubly-fed motor power is applied both to the stator and to the rotor. Since the rotor is fully utilised in the latter case, the power ✓

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output is double that of an induction motor with the same rated current. The magnetising current of the doubly-fed motor is also less because the resultant magnetic field is created by the turns of both stator and rotor and so the power factor is greater, being about 0.98. Iron losses in the doubly-fed motor are double what they would be in an induction motor but since the other losses remain the same and the output is doubled, the efficiency is greater. To confirm the above statements, tests were made on motors for speeds of 2000, 3000 and 6000 rpm with various transformation ratios. Curves of current, active and reactive power, efficiency and power factor as functions of useful output on the motor shaft are given in Fig 7, for machines of the same size as a wound-rotor induction motor of 4.5 kW. The tests confirm that the motor has a good performance and that the power output is doubled at the rated current of 30 A. Points obtained from the circle diagram are given in Fig 7 and show good agreement with the test results. It is concluded that

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doubly-fed motors should be particularly useful for  
speeds of 6000 rpm.

There are 7 figures, 1 table and 3 references, of which  
2 are Soviet and 1 German.

ASSOCIATION: Kafedra elektricheskikh mashin, Ural'skiy  
politekhnicheskiy institut (Chair of Electrical  
Card 5/5 Machines, Urals Polytechnical Institute) ✓

SUBMITTED: June 15, 1959

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*Viktor Mikheyevich*  
AUTHORS: Pavlinin, V.M., Aspirant; and Siunov, N.S.<sup>*Viktor Mikheyevich*</sup>, Doctor of  
Technical Sciences, Professor, Head of the Chair

TITLE: The Properties and Efficiency of a Single-Machine  
Frequency-Changer

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy,  
Elektromekhanika, 1960, Nr 1, pp 84-92 (USSR)

ABSTRACT: In recent years considerable attention has been paid to  
the development of single-machine frequency-changers in  
order to reduce the weight and dimensions of the  
equipment. However, the complexity of the electro-  
magnetic processes in these machines and the inadequate  
understanding of their properties have hindered their  
widespread introduction. The present article gives some  
results of an investigation of a machine of this kind  
converting from 50 to 200 c/s, the machine being in effect  
an induction motor and a synchronous alternator with a  
common magnetic system. The stator slots of the machine  
contain two three-phase windings without mutual  
inductance. The first (1), corresponding to the motor,  
has an appropriate number of poles, and the other (4)  
corresponding to the alternator, has a different number

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# The Properties and Efficiency of a Single-Machine Frequency-Changer

of poles. The rotor carries a squirrel-cage winding (2) and an alternator field winding (3) with an appropriate number of poles. The alternator field winding is energised through slip-rings from a rectifier (5) supplied from a voltage-stabilising device. The winding (1) is connected to a 50 c/s supply and by reaction with the rotor winding (2) drives the rotor. The complete circuit arrangement is shown in Fig 1. When the alternator is loaded, interaction between its windings (3) and (4) sets up a retarding or generator torque which reacts directly on the driving or motor torque, so that no surplus torque appears at the machine shaft. The process of power conversion is illustrated by the energy diagram of Fig 2. The influence of the one machine on the parameters and characteristics of the other when both have a common magnetic circuit is described by reference to an experimental frequency-changer type OPCh-32 built at the Kamensk-Ural'sk Electro-Mechanical Works by adaptation of an induction motor type MR-53-4.2. Two further experimental machines have also been built and

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The Properties and Efficiency of a Single-Machine Frequency-Changer tested with identical results. The most important data of the frequency-changer type OPCh-3 are given in Table 1. Calculated values of motor and alternator induction and of total induction are given in Table 2. Load tests showed that the temperature rise of the windings was within the limits permitted by the standard GOST 183-55. The temperature rise by resistance was 51 °C for the stator winding and 39 °C for the field winding. The external characteristics of the alternator with the voltage stabiliser in operation at unity and 0.75 power factors are plotted in Fig 3. Oscillogram charts of transient processes in the frequency-changer are seen in Fig 4. Here, chart 1 corresponds to starting the motor at full supply voltage with the stabilising device connected to the alternator. Chart 2 corresponds to a sudden three-phase short-circuit of the stabilised alternator. Corresponding oscillograms with the voltage stabiliser disconnected and constant current excitation are given in chart 3. The oscillogram charts 4 and 5 correspond to the sudden removal of full resistive and

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rated load with the voltage stabiliser in use. It will be seen that the transient processes in a high-frequency alternator built in a common magnetic circuit with a motor, do not differ from those for normal alternators excited by semiconductor rectifiers. Analysis of oscillograms of steady-state and transient conditions with various degrees of saturation of the magnetic circuit indicate that under all conditions the combined machine behaves like the alternator and motor in a two-machine set. The motor currents and e.m.f.'s do not contain harmonics of the alternator frequency and its e.m.f. curve does not contain harmonics of the power frequency. Both current and voltage wave-shapes are satisfactory. Fig 5 gives oscillograms of phase-voltages and currents of the motor and alternator parts of the frequency changer on no-load and at rated load. The tooth harmonics occurring in the phase-voltage of the alternator can easily be prevented by a more suitable choice of winding pitch or by skewing the slots. The presence in a single core of two magnetic fields

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with different pole pitches gives rise to a number of effects associated with changes in permeability when the steel is magnetised simultaneously by fluxes of the different frequencies. This point is briefly discussed, and a formula is given for the change in reluctance of the magnetic circuit of one part of the machine due to the presence of the field of the other. The increases in reluctance of the magnetic circuit with increase in alternator flux and motor flux are plotted in Figs 6 and 7 respectively, both for different levels of saturation. Analysis of these figures and of the data given in Table 2 shows that the increase does not exceed 1.25 provided that the sum of the generator and motor induction in each section of the magnetic circuit does not exceed the normal values of induction for ordinary machines. The leakage reactance of the one part of the machine is little affected by the presence of the field of the other. The iron losses in the combined machine may be greater than the sum of the losses with separate magnetisation, as is illustrated by the graph plotted in Fig 8 for various

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values of generator and motor field. This graph and the data given in Table 2, and test results from other examples of frequency-changer, indicate that the iron-loss increase does not exceed 1.25 provided that the total induction of the alternator and motor in other parts of the magnetic circuit does not exceed normal values of induction for ordinary electrical machines. Operating characteristics of an experimental frequency-changer type OPCh-3 are plotted in Fig 9; the rated load efficiency of the set is 71%, allowing for field losses. The maximum efficiency of 72% is achieved at three-quarters rated load. At rated load the power factor is 0.92. The efficiency and power factor remain quite high down to half load. The performance of the experimental frequency-changer may be assessed by comparing it with a two-machine frequency-changer set using an induction motor type MU-72/2<sup>2</sup> with a single-machine synchronous frequency-changer type PSCh-5.<sup>2</sup> All three have an induction motor component of the same speed (3000 r.p.m.), frequency

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The Properties and Efficiency of a Single-Machine Frequency-Changer (50 c/s) and voltage (220/380 V). The principal data of the machines are given in Table 3. It will be seen that the experimental machine has the highest efficiency and power factor and smallest weight per unit output. There was also economy in steel of 30% and in copper of 4.5% as compared with a machine type PSCh-5. It should be pointed out that the design of the experimental frequency-changers OPCh-3 was not ideal, being limited by the slot geometry of the stampings of induction motor type MR-53-4. The following students participated in the design of these frequency-changers: A.V. Dvornikov, Yu.K. Cherepanov, B.G. Balter, S.I. Kazakova, and Yu.K. Radionov. The calculations demonstrated that the performance of the new machine as compared with a two-machine set improves with increase in output. The economy of material becomes 30 - 60%. The efficiency of the new machine is equal to or somewhat higher than that of a two-machine set, and the power factor is higher. The motor and alternator reactances of the new machine are of normal value and it is appreciably smaller than a

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two-machine set. It has two windings in a single slot, a disadvantage which it shares with multi-speed motors. On the basis of the investigations carried out the new type of frequency-changer is recommended for industrial use. The machine, partially dismantled, is depicted in Fig 10. ✓

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There are 10 figures, 3 tables and 7 references of which 5 are Soviet and 2 German.

ASSOCIATION: Kafedra elektricheskikh mashin, Ural'skiy  
politekhnichestkiy institut  
(Chair of Electrical Machinery, Ural Polytechnical  
Institute)

DATE: July 16, 1959

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E194/E355

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Technical Sciences, Senior Lecturer and  
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TITLE: The Influence of Capacitance on the Operation of a  
Mechanical Rectifier

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy,  
Elektromekhanika, 1960, No. 10, pp. 93 - 97


TEXT: Current commutation by a mechanical rectifier in the  
field circuit of a synchronous motor may be improved by  
shunting the rectifier brushes by ohmic resistance. However,  
such resistances lower the efficiency of the rectifier. ✓  
Better and more efficient commutation may be obtained by using  
additional capacitances instead of the shunt resistances. In  
view of the previous article by some of the present authors,  
published in this journal, 1959, No. 6, the operation of  
mechanical rectifiers is now considered and the conditions  
necessary to obtain sparkless commutation are established.  
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# The Influence of Capacitance on the Operation of a Mechanical Rectifier

Fig. 1 shows a circuit of a single-phase mechanical two-plate rectifier with supply transformer. The differential equation for the concluding stage of commutation is given and analysis of its solution makes it possible to establish a physical picture of the processes during current commutation. Near the point where the voltage of the supply to the rectifier passes through zero there is a certain current when the transformer and load circuit are interrupted. As both transformer and load have appreciable inductance, a charging current passes into the capacitor. Later the capacitance discharges, partially through the transformer winding and partially through the load. The process of discharge may be periodic or aperiodic. Since the natural capacitance of the transformer is small, considerable over-voltages are set up in the process of current switching; their peak values reach 200 - 230 V. These over-voltages can cause severe sparking at the brushes. As the



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capacitance is increased the over-voltage is reduced, and the duration of the concluding stage of commutation extends because the frequency of voltage restoration falls. Restoration of the voltage follows a sinusoidal law. The amplitude is exponentially damped and is superimposed on the sinusoidal supply voltage. As the capacitance is increased to a value of  $4 L/r^2$ , the periodic law of voltage restoration becomes aperiodic, so improving the electromagnetic conditions of current commutation. The rectifier ceases to spark over a wide range of change of load. All this is illustrated by the oscillograms of Fig. 2. Operation of a three-phase mechanical rectifier is then considered. The principles of this machine have been described elsewhere and are not enumerated, here. The influence of capacitance on the current commutation of a three-phase mechanical rectifier was studied with the circuit

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# The Influence of Capacitance on the Operation of a Mechanical Rectifier

shown schematically in Fig. 3. The tests were made with purely resistive and also with mixed inductive loads. This second type of load is the most difficult to provide for and so the results given below relate to it. Fig. 4 shows oscillograms of rectified voltage and current (a) with a capacitance of 1 036  $\mu$ F and (b) with a resistance of 3.3 ohm and no capacitance.

It will be seen that the over-voltage peaks typical of mechanical rectifiers without shunt resistances are absent from both these curves. When shunt resistance is used there is an appreciable fall in the efficiency of the rectifier, whereas with shunt capacitance the efficiency is 97%. Fig. 5 shows oscillograms of rectified current and voltage (a) with shunt capacitance and (b) with shunt resistance. The rectification coefficient is 10 - 15% higher with capacitance than with resistance. The article concludes with

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instructions for adjusting the rectifier to secure optimum operating conditions. There are 5 figures and 4 Soviet references.

ASSOCIATION: Kafedra elektricheskikh mashin Ural'skogo politekhnicheskogo instituta (Department of Electrical Machines, Ural Polytechnical Institute)

SUBMITTED: January 20, 1960

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AUTHORS: Siunov, N.S., Doctor of Technical Sciences, Professor,  
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TITLE: Practical Adjustment of Current Commutation

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Elektromekhanika,  
1960, Nr 3, pp 71-74 (USSR)

ABSTRACT: An editorial note states that the method was developed  
simultaneously by A.G. Nazikyan of the Novocherkassk  
Polytechnical Institute.

Previous work has shown that commutation of motors may be improved by connecting capacitors either between individual commutator bars or between the main brush and an auxiliary brush located behind its trailing edge. The second of these methods is more convenient because it does not involve mounting capacitors on the armature but it is somewhat less effective. The tests described were made on a d.c. motor of 6.8 kW, 220 V, 1000 rpm. An oscillogram of the commutation voltage is given in Fig 2 and shows that after the brush has opened the short-

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#### Practical Adjustment of Current Commutation

circuit on the section, the voltage across the section is restored on a rapidly damped curve, in accordance with the theoretical conclusions of an article published by the author in Elektromekhanika, 1959, Nr 6. These overvoltage peaks can vary over a wide range. A graph of the overvoltage amplitude as a function of the capacitance connected for the motor under test is plotted in Fig 3 and it will be seen that the curve is asymptotic. The first ten microfarads of capacitance notably reduce the overvoltage: thereafter considerable increase in capacitance causes relatively small further decrease. It was found that on introducing capacitance into the auxiliary brush circuit, the zone of sparkless operation is extended by 20 to 25% and is limited by sparking at the auxiliary brush. A graph of the amplitude of overvoltage as a function of interpole boost is plotted in Fig 4 and shows that up to a point, interpole boost reduces the overvoltage amplitude. Beyond this point the overvoltage increases again, though it is now of opposite sign, as will be seen from

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